Space Weather Forecast

Issued on Saturday, 06 May 2023 at 01:28 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: R1-R2 blackouts expected throughout with a slight chance of R3 Strong radio blackouts. G1-G2/Minor-Moderate Storm conditions expected 7-8 May with a chance of G3/Strong Storm conditions.

Analysis of Space Weather Activity over past 24 hours
Solar Activity: Solar activity has been Moderate, with two Moderate class flares observed from a complex region in the northeast quadrant. This is close to another region, further to the east, which is also complex and carries a similarly high flare risk. A magnetically complex region in the northeast centre disc, still carries a high flare risk, but appears to have simplified magnetically. The remaining regions are all small and benign, with no notable activity.
A series of CMEs have left the Sun in the last 24 hours, with the most significant a full halo CME observed following the Moderate class flare. This is forecast to affect the Earth on 07 May in combination with a CME from 04 May.

Solar Wind / Geomagnetic Activity: The solar wind observed has steadily declined to background levels through the period. Magnetic field strength was weak, with the north-south component varying weakly. Geomagnetic activity was Quiet (Kp 0-2) throughout.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at background with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary
Solar Activity: Moderate activity is expected through the next four days, with a slight chance of Strong activity, mainly from the regions in the northeast of the visible disc. Further regions rotating from the farside could enhance any flare risk.

Solar Wind / Geomagnetic Activity: Two CMEs which left the Sun on 04 and 05 May respectively, are forecast to arrive concurrently on 07 May, with a risk of effects into 08 May. A number of partial halo CMEs are also forecast to combine with the two full halo CMEs, all with Earth-directed components. There is moderate confidence in the forecast arrival time of the CMEs. A fast solar wind is forecast to connect with Earth on 06 May, with estimated speeds of 500-600km/s, although this is with high uncertainty in the speed.

Geomagnetic activity is expected to start Quiet to Unsettled, but with a chance of Active or G1/Minor Storms on 06 May due to the possible fast solar wind connection. G1/Minor or G2/Moderate storms are expected on 07 May, with a chance of G3/Strong storms due to the forecast CME arrivals with impact expected into 08 May. Residual and declining storming is then possible through to 09 May.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is most likely to persist at background levels with no solar radiation storms occurring. However count rates may increase with any notable flares that occur, with a slight chance of reaching the S1/Minor Radiation Storm threshold throughout, mainly from the complex regions in the northeast quadrant.
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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	30	70	70	50
Strong	G3	No	1	20	20	5
Severe	G4	No	1	3	3	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	70	70	70	70
Very Active	R3 to R5 X	No	15	15	15	15

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	15	10	15	15
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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